REMARKS

The specification has been amended to correct grammatical and spelling errors. In addition, the specification has been amended to incorporate the numeric identifiers S1-S7 shown in Figure 4, as originally filed. No new matter has been added.

Claims 3-5 have been amended to correct spelling and grammatical errors. Claims 1-7 remain in the application.

The drawings and specification were objected to under 37 C.F.R. 1.84(p)(5). The Examiner was concerned about the reference numerals S1-S7 shown in Figure 4, as well as the description of Figure 3. Figures 3a and 3b are discussed on page 6 of the application, at lines 9 and 10, as originally filed. Furthermore, the striped pattern shown in Figure 3a and the lattice pattern shown in Figure 3b are specifically referenced on page 11, line 23 and page 12, line 2. Given that the pattern is the focus of the specification and drawings, no numeral identifier appears to be in order, and Figures 3a and 3b should be accepted as provided. With respect to Figure 4, the numeric identifiers S1-S7, shown in Figure 4 as originally filed, have now been added to the specification. In view of the above, the objection should now be withdrawn.

The Abstract was objected to for exceeding 150 words and including the phrase "(Fig. 4)". By this amendment., the Abstract has been reduced in length to less than 150 words, and the phrase "(Fig. 4)" has been eliminated.

The Examiner has objected to the specification as failing to provide antecedent basis for the subject matter claimed in claims 3 and 5. The undersigned traverses. As discussed in the specification, and recited in the claims, h4, h6, h8 constitute higher-order variables that are determined according to the present method. The higher-order variables h4, h6, h8 have unknown numerical values until they are calculated. With regard to page 13, line 6, variables h4, h6, h8 are 'set to be zero' as an initialization step in the calculation method. Zero is not a fixed value for h4, h6, or h8. With regard to page 15, lines 15-20, h4=+1.639, h6=-3.20, and h8=+2.57 are merely exemplary calculated values for a set of 5 lenses and are calculated from the graph of Fig 5. Thus, the values of h4, h6, and h8 are not fixed values and there is no

logical error or antecedent basis error in describing h4, h6, h8 both as variables and as numbers that are determined by calculation.

Claim 5 was rejected for non-statutory subject matter under 35 U.S.C. 101, and for indefiniteness under 35 U.S.C. 112, second paragraph. The grounds for each rejection appear to be the Examiner's focus on the calculation steps performed by the computing unit. The undersigned traverses both rejections. Claim 5 is directed to an apparatus, and further defines that the computing unit has a storage medium storing therein a program which executes a method. Thus, claim 5 does not mix and match apparatus and method claims as suggested by the Examiner, and is clearly directed to an apparatus which is of statutory subject matter.

Claims 1-3 were rejected as being obvious over Yamamoto (JP 55044949A) in view of Baba (RE 33,227) and Kittaka (U.S. Patent 5,949,585). Claims 4-7 were rejected as being obvious over Yamamoto. These rejections are traversed.

The invention is a method for measuring gradient index distribution of a gradient index rod lens by calculating higher-order index distribution coefficients of the rod lens on the basis of a measurement of curvature of field, and has particular application to evaluating optical performance of a small-diameter rod lens (see the application on page 1 at lines 2-9).

As noted on page 2 of the application, a prior art method of obtaining gradient index distribution of a gradient index rod lens involves calculating back the gradient index distribution by measuring spherical aberration of a P/4 lens. The Yamamoto reference relied on by the Examiner is similar to this prior art, and teaches measuring the spherical aberration in order to obtain refractive index distribution. However, as noted on page 3 of the application, there are some limitations in such conventional methods which employ the measurement of spherical aberration (e.g., it is necessary that the measurement is repeated while the position of incidence of light is changed in a direction of the radius of the rod lens–this is difficult when the rod lens has a diameter of 1 mm or smaller; in addition, the wavelength for measurement is limited to the wavelength of laser light used (see page 4, line 4 of the application).

Yamamoto sets forth the following as a basic approximate expression:

$$n(r)^2=n^2\cdot\{1-(g\cdot r)^2+h_4(g\cdot r)^4\}$$

This expression has lower order than is required in the claimed invention, and it should thus be understood that Yamamoto's expressions are general ones for defining a gradient index distribution of a gradient index lens. For comparison, claim 1 recites:

"A method of measuring a radial gradient index distribution n(r) of a rod lens by calculating higher-order index distribution coefficients indicating said gradient index distribution n(r) when n(r) is given by the expression:

$$n(r)^2=n_0^2 - \{1 - (g\cdot r)^2 + h_4(g\cdot r)^4 + h_6(g\cdot r)^6 + h_8(g\cdot r)^8 +...\}$$

in which r is a radial distance measured from an optical axis, n_0 is a refractive inex on the optical axis, g is a secondary index distribution coefficient, and h_4, h_6, and h_8 are higher-order index distribution coefficients...

(4) calculating back higher-order index distribution coefficients by a fitting process on the basis of said position of the paraxial focal point and said curve of said curvature of field." (Emphasis added)

In the present case, the higher-order index distribution coefficients are obtained accurately by the fitting process, and this is a key feature of the invention which is not contemplated by Yamamoto. Yamamoto fails to teach obtaining the higher-order index distribution coefficients by a fitting process. As such, the claimed invention is new and unobvious over Yamamoto. While Kittaka and Baba mention the above expressions, they are silent about how to obtain the higher-order distribution coefficients. Therefore, the claimed invention would not be accomplished by a combination of the cited references.

In view of the foregoing, it is respectfully requested that the application be reconsidered, that claims 1-7 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

A provisional petition is hereby made for any extension of time necessary for the continued pendency during the life of this application. Please charge any fees for such provisional petition and any deficiencies in fees and credit any overpayment of

fees to Attorney's Deposit Account No. 50-2041.

Respectfully submitted,

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